

A NEW FEATURE IN BAMBOO RHIZOME ANATOMY¹

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In the course of my search for vegetative characters that effectively differentiate the two currently recognized species of *Arundinaria* native to the United States I discovered that, in cross section, the rhizomes of *A. tecta* (Walt.) Muhl. show well-developed peripheral air canals (fig. 1),³ a feature of bamboo anatomy apparently not hitherto reported. In both living plants and dried herbarium specimens, this feature was present in all rhizomes associated with flowering material identified as belonging to this species. I have not, however, found air canals in the rhizome of any plant or specimen typical of *A. gigantea* (Walt.) Muhl. (fig. 2) the only other currently recognized species native to this country.

This anatomical feature is presumed to originate in the same manner as similar spaces found in the stems of some herbaceous grasses of the genera *Leersia*, *Oryza*, *Sacciolepis*, etc. (cf. C. R. Metcalfe, *Anatomy of the Monocotyledons*, I. Gramineae. The Clarendon Press, Oxford. lxi and 731 p., illus., bibl. 1960.)

Anatomical details shown by cross sections of bamboo rhizomes are illustrated by Shibata (1900, fig. 2 & 3) for *A. nipponica* (as *Bambusa nipponica*) and for *A. japonica*; by Takenouchi (1931, pl. 1, fig. 2-4) for 3 species in 2 genera; and by Takenouchi (1932, fig. 7-10) for 7 species in 4 genera. No illustration or mention of the presence of air canals in the bamboo rhizome appears in any of these works. No other illustration or discussion of bamboo rhizome anatomy has come to my attention.

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³Rhizome sections and the photographs on which the illustrations are based were prepared by Professor Yong-no Lee, on leave from the Department of Biology, Ewha Woman's University, Seoul, Korea, using facilities made available by the Department of Botany, Yale University.

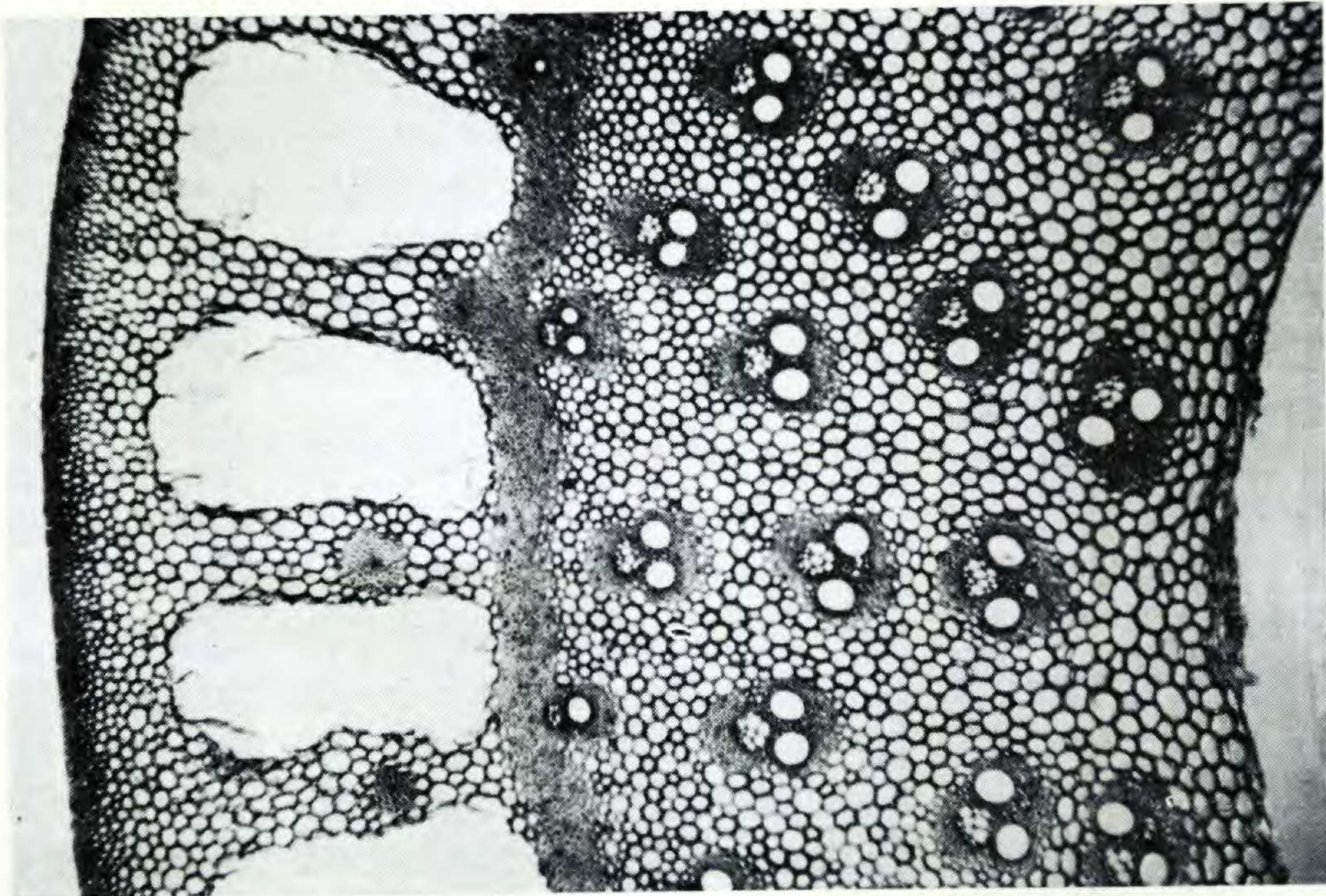


Fig. 1. Cross section of a young rhizome of *A. tecta*, showing air canals, ca. $\times 25$. Study material taken from living plants originally native at Stony Run, Anne Arundel Co., Md., cultivated under MBG 2762 at 5507 Charles Street, Bethesda, Md.

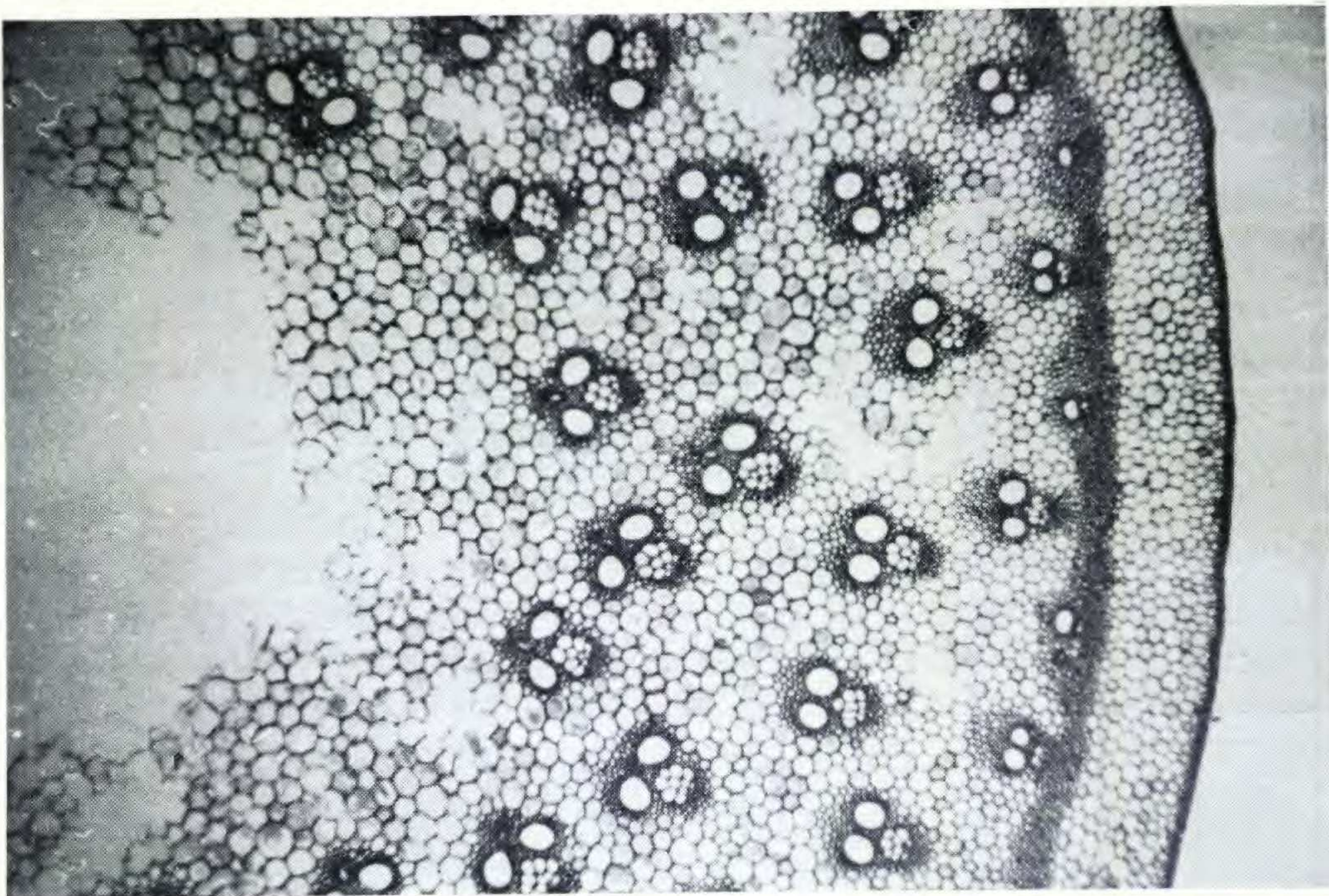


Plate 1884

Fig. 2. Cross section of a young rhizome of *A. gigantea*, showing absence of air canals, ca. $\times 25$. Study material taken from living plants originally native at Lebanon, Warren County, Ohio, cultivated under MBG 2792 at 5507 Charles Street, Bethesda, Md.

Although the presence of air canals in their rhizomes may be presumed to have certain adaptive advantages to plants growing in waterlogged soil or on frequently inundated sites, its presence or absence apparently is not, in our native bamboos, influenced in any way by the ecological conditions under which the plants happen to be growing. This is presumed, therefore, to be an inherited, rather than an ecological manifestation.

The results of exploratory studies in field and herbarium indicate that the presence or absence of air canals in the rhizomes can be used with confidence to differentiate plants typical of these two species, even in the sterile condition.

This feature was originally discovered by means of a 9× hand lens, and the presence or absence of air canals can be diagnosed easily without the use of a compound microscope. Air canals in the rhizomes of *Arundinaria tecta* are typically continuous, longitudinally, through the nodes and internodes, and are typically distributed uniformly around the periphery of the rhizome axis. However, two specimens have been found, in which their distribution is discontinuous, both peripherally and longitudinally: Biltmore 1405 [leg. C. D. Beadle ?], and Radford & Wood 6879-A, both from North Carolina.

LITERATURE CITED

- SHIBATA, K. 1900. Beiträge zur Wachstumsgeschichte der Bambusgewächse. Jour. Coll. Sci. Imp. Tokyo 13:427-496. pl. 22-24 (fig 1-61).
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- _____. 1932. [Studies of Bamboo] [Tokyo] 291 p., 181 text fig., 31 tables. Bibl. (Text in Japanese).